WHAT IS CLAIMED IS:

1. A shape measuring apparatus comprising:

at least two photo-sensors for converting received light to electrical light reception signals, one photo-sensor having a photo-sensing characteristic identical to another photo-sensor;

a first beam splitter which splits a light beam in a predetermined light amount ratio, and introduces split light beams to the photo-sensors, respectively;

an optical system which introduces a light beam reflected from an object to be measured to the beam splitter, and has a focal point movable in relative to the object;

a driver which drives the optical system to move the focal point;

a signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the signal processing section including:

a first displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in an incident direction;

a signal memory which stores light reception signals outputted from each of the photo-sensors;

a first corrector which corrects errors of light reception signals from one photo-sensor with respect to light reception signals from another photo-sensor in the incident direction based on the relative

displacement stored in the first displacement memory; and

a signal processor which combines light reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from a saturated part of one photo-sensor with light reception signals from a corresponding part of another photo-sensor.

2. A shape measuring apparatus according to claim 1, wherein the signal processing section further comprises:

a second displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in a direction perpendicular to the incident direction; and

a second corrector which corrects light reception signal errors resulting from the relative displacement in the direction perpendicular to the incident direction based on the relative displacement stored in the second displacement memory.

3. A shape measuring apparatus according to claim 2, wherein each photo-sensor includes a number of pixels arranged in the direction perpendicular to the incident direction.

4. A shape measuring apparatus according to claim 3, wherein the first and second correctors execute the correction

for each pixel.

5. A shape measuring apparatus according to claim 4, wherein the relative displacement in the incident direction and the relative displacement in the perpendicular direction each are a single value applicable for all the pixels.

6. A shape measuring apparatus according to claim 1, wherein each photo-sensor includes a number of pixels arranged in the direction perpendicular to the incident direction.

7. A shape measuring apparatus according to claim 1, wherein each of the photo-sensors is provided at another focal point of the optical system, further comprising:

a light source which is provided at another focal point of the optical system to generate illumination light for illuminating the object; and

a second beam splitter which is provided between the light source and the photo-sensors to introduce the illumination light to the optical system, and reflected light from the object to the first beam splitter.

8. A shape measuring apparatus comprising:

at least two photo-sensors for converting received light to electrical light reception signals, one photo-sensor having a

photo-sensing characteristic identical to another photo-sensor;

a first beam splitter which splits a light beam in a predetermined light amount ratio, and introduces split light beams to the photo-sensors, respectively;

an optical system which introduces a light beam reflected from an object to be measured to the beam splitter, and has a focal point movable in relative to the object;

a driver which drives the optical system to move the focal point;

a signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the signal processing section including:

a first displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in a direction perpendicular to an incident direction;

a signal memory which stores light reception signals outputted from each of the photo-sensors;

a first corrector which corrects errors of light reception signals from one photo-sensor with respect to light reception signals from another photo-sensor in the perpendicular direction based on the relative displacement stored in the first displacement memory; and

a signal processor which combines light

reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from a saturated part of one photo-sensor with light reception signals from a corresponding part of another photo-sensor.

9. A shape measuring apparatus according to claim 8, wherein each photo-sensor includes a number of pixels arranged in the direction perpendicular to the incident direction.

10. A shape measuring apparatus according to claim 9, wherein the first and second correctors execute the correction for each pixel.

11. A shape measuring apparatus according to claim 8, wherein each of the photo-sensors is provided at another focal point of the optical system, further comprising:

a light source which is provided at another focal point of the optical system to generate illumination light for illuminating the object; and

a second beam splitter which is provided between the light source and the photo-sensors to introduce the illumination light to the optical system, and reflected light from the object to the first beam splitter.

12. A shape measuring apparatus comprising:

at least two photo-sensors, each photo-sensor including a number of pixels arranged in a specified direction for converting received light to electrical light reception signals, one photo-sensor having a photo-sensing characteristic identical to another photo-sensor;

a beam splitter which splits a light beam in a predetermined light amount ratio, and introduces split light beams to the photo-sensors, respectively;

an optical system which introduces a light beam reflected from an object to be measured to the beam splitter, and has a focal point movable in relative to the object;

a driver which drives the optical system to move the focal point;

a first signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the first signal processing section including:

a first displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in the pixel arrangement direction;

a first signal memory which stores light reception signals outputted from each of the photo-sensors;

a first corrector which corrects errors of light reception signals from one photo-sensor with respect to light reception signals from another photo-sensor in the pixel arrangement direction based on the relative displacement stored in the first displacement memory; and

a signal processor which combines light reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from saturated pixels of one photo-sensor with light reception signals from corresponding pixels of another photo-sensor;

a second signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the second signal processing section including:

a corrector which corrects a relative displacement between one photo-sensor and another photo-sensor in the pixel arrangement direction by a pitch of pixel by delaying the sending of the reception signals from one photo-sensor with respect to the sending of the reception signals from another photo-sensor; and

a signal processor which combines light

reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from saturated pixels of one photo-sensor with light reception signals from corresponding pixels of another photo-sensor;

a changer which changes over the first signal processing section and the second signal processing section;

a mode setter which switchingly sets a first measurement mode and a second measurement mode; and

a controller which is responsive to the mode setter to render the first signal processing section execute the combination processing when the first measurement mode is set, and render the second signal processing section execute the combination processing when the second measurement mode is set.

13. A shape measuring apparatus according to claim 12, wherein each of the first and second signal processing sections further comprises:

a second displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in an incident direction; and

a second corrector which corrects light reception signal errors resulting from the relative displacement in the incident direction based on the relative displacement stored in the

second displacement memory.

14. A shape measuring apparatus according to claim 13, wherein the first and second correctors of the first signal processing section execute the correction for each pixel.

15. A shape measuring apparatus according to claim 14, wherein the relative displacement in the pixel arrangement direction and the relative displacement in the incident direction each are a single value applicable for all the pixels.

16. A shape measuring apparatus according to claim 12, wherein the first and second correctors of the first signal processing section execute the correction for each pixel.

17. A shape measuring apparatus according to claim 12, wherein each of the photo-sensors is provided at another focal point of the optical system, further comprising:

a light source which is provided at another focal point of the optical system to generate illumination light for illuminating the object; and

a second beam splitter which is provided between the light source and the photo-sensors to introduce the illumination light to the optical system, and reflected light from the object to the first beam splitter.

18. A shape measuring apparatus comprising:

at least two photo-sensors, each photo-sensor including a number of pixels arranged in a specified direction for converting received light to electrical light reception signals, one photo-sensor having a photo-sensing characteristic identical to another photo-sensor;

a beam splitter which splits a light beam in a predetermined light amount ratio, and introduces split light beams to the photo-sensors, respectively;

an optical system which introduces a light beam reflected from an object to be measured to the beam splitter, and has a focal point movable in relative to the object;

a driver which drives the optical system to move the focal point;

a first signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the first signal processing section including:

a first displacement memory which stores a relative displacement between one photo-sensor and another photo-sensor in an incident direction;

a first signal memory which stores light reception signals outputted from each of the photo-sensors;

a first corrector which corrects errors of light reception signals from one photo-sensor with respect to light reception signals from another photo-sensor in the incident direction based on the relative displacement stored in the first displacement memory; and

a signal processor which combines light reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from saturated pixels of one photo-sensor with light reception signals from corresponding pixels of another photo-sensor;

a second signal processing section which executes combination processing to light reception signals outputted from the photo-sensors, the second signal processing section including:

a corrector which corrects a relative displacement between one photo-sensor and another photo-sensor in the incident direction by a pitch of pixel by delaying the sending of the reception signals from one photo-sensor with respect to the sending of the reception signals from another photo-sensor; and

a signal processor which combines light

reception signals from one photo-sensor with light reception signals from another photo-sensor by replacing light reception signals from saturated pixels of one photo-sensor with light reception signals from corresponding pixels of another photo-sensor;

a changer which changes over the first signal processing section and the second signal processing section;

a mode setter which switchingly sets a first measurement mode and a second measurement mode; and

a controller which is responsive to the mode setter to render the first signal processing section execute the combination processing when the first measurement mode is set, and render the second signal processing section execute the combination processing when the second measurement mode is set.

19. A shape measuring apparatus according to claim 18, wherein the first and second correctors of the first signal processing section execute the correction for each pixel.

20. A shape measuring apparatus according to claim 18, wherein the relative displacement in the incident direction is a single value applicable for all the pixels.

21. A shape measuring apparatus according to claim 18,

wherein each of the photo-sensors is provided at another focal point of the optical system, further comprising:

a light source which is provided at another focal point of the optical system to generate illumination light for illuminating the object; and

a second beam splitter which is provided between the light source and the photo-sensors to introduce the illumination light to the optical system, and reflected light from the object to the first beam splitter.